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FOREIGN TECHNOLOGY DIVISION

CONTEMPORARY CHINA'S METEOROLOGICAL ENTERPRISES

(Selected Portions)

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HUMAN TRANSLATION

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CHAPTER 2

THE NETWORK OF METEOROLOGICAL STATIONS AND POSTS

2.1 General Introduction

Meteorological stations and meteorological posts are the organizational foundation of the entire country's meteorological work. The basic duties of the stations and posts are (1) to undertake atmospheric observations and measurements, and (2) to develop meteorological services. Every aspect of their work is of a highly specialized and technical nature.

The meteorological stations and posts, using a variety of means, undertake continuous soundings of the atmosphere in three dimensional space, record accurately changes in atmospheric conditions, gather meteorological data and material, and transmit all weather information in a timely manner. These data and transmissions are the basis for the preparation of weather forecasts, the analysis of climate, and the scientific study of the atmosphere. At the same time, the meteorological stations and posts are also responsible for meteorological services on behalf of the national economy and the national defense, offering meteorological advice to all levels of party and governmental leadership as well as to production departments in their direction of production and in their efforts at disaster prevention and disaster control.

2.1.1 The Meteorological station and Post Network: Organizational Principles and the Division of Duties

Based on the organizational systems of which they are a part, meteorological stations and posts can generally be classified as national stations and posts, subordinate to the national weather department (Fig. 4), and specialized stations and posts, subordinate to the organization of a specific department. Both are incorporated into the all-China meteorological station and post network. In addition, there is also a group of small weather observation posts involving the participation of the masses.

The national meteorological station and post network, composed of the national stations and posts, is the backbone of the all-China network. The specialized stations and posts and the small mass-character stations supplement the national network.

The quality of a country's meteorological station and post network, including their number and distributional density, the quality of the personnel, the technical equipment and observation site conditions, are an important indication of the level of development of that country's meteorological operations.

From the point of view of atmospheric observation, the overall arrangement of the national meteorological stations and posts, considering spacial density and natural conditions, is intended to allow monitoring of changes in weather and to reflect climatic characteristics. It must both fulfill the requirements of professional work and scientific inquiry, and take into account the administrative system, adapting itself to the service of building the national economy and national defense. Since the founding of our People's Republic, the principles for establishing the meteorological network have changed along with the requirements and duties of the times. In 1979, the conference of all weather bureau chiefs from the whole country, on the basis of their collective past experience, determined "to combine, under a unified national program, considerations of natural conditions (meteorological, climatic and geographical characteristics) and the administrative system, and with a view to the requirements for modernizing service, professional work, scientific investigation and meteorology, to make great efforts to create rational [principles for the establishment of meteorological stations and posts]." Specialized stations and posts and mass-type posts would be established and distributed according to the needs of the respective special department or the masses.

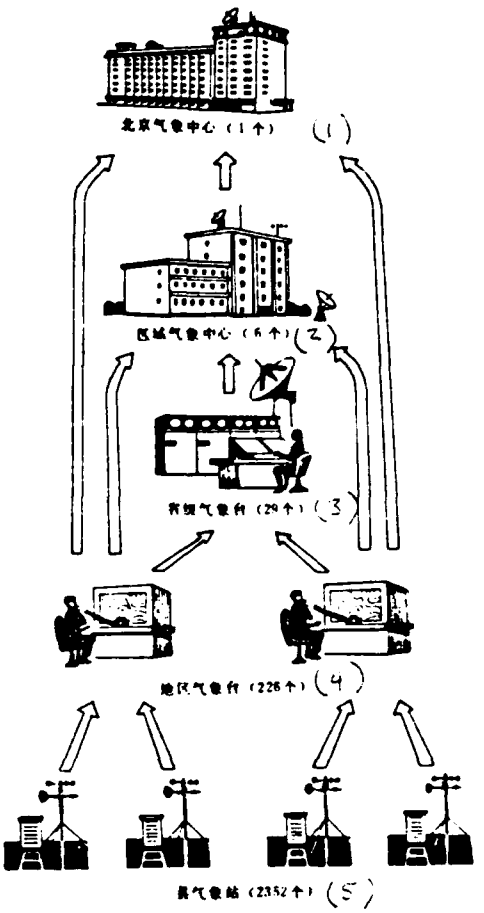


Fig. 4. Organizational sketch of the all-China meteorological station and post network. Key: (1) Beijing Weather Center, 1; (2) regional centers, 6; (3) provincial stations, 29; (4) local stations, 226; (5) county posts, 2352.

Within the national network, every level of meteorological station and post has a different job according to the professional meteorological work and service that it performs.

The Beijing Weather Center (Fig. 14 [Translator's note: Figure 14 is not included in this selection]) is the professional service center for meteorological forecasts, information, communication, data processing, and climate analysis for the entire country. It is responsible for professional and technical guidance for national meteorological work; issues forecasts and

warnings for large-scale weather conditions, typhoons, cold waves and other calamitous weather conditions; and provides all meteorological services for the Central Committee of the Party, the State Council, and related departments. Internationally, it assumes the responsibility, within the world-wide meteorological monitoring network, of a greater regional meteorological center and communications hub.

The regional central meteorological stations are the regional professional and service centers for internal weather reports and communications. They are responsible for service and technical leadership in forecasts and communications within their own region (of which the extent is determined by the National Weather Bureau), and also assume the responsibility for the duties of the weather stations in the province or nationally administered city in which they are located. The regional weather station for the Northeast is located in Shenyang, that for East China in Shanghai, that for the South Central Region in Wuhan, that for the Southwest in Chengdu, that for the Northwest in Lanzhou, and that for South China in Guangzhou; responsibility for the North China Region is assumed by the Beijing Weather Center. The Shanghai and Guangzhou central weather stations (Fig. 15 [Translator's note: Not included]) and the Dalian weather station, per the National Weather Bureau's prescription, are also responsible for weather forecast service for a defined sea region.

Meteorological stations for provinces, municipalities and autonomous regions are set up in the respective capitals (Fig. 5), and are responsible for weather forecasts, warnings, processing of data, analysis, weather information and other services and technical direction for the province, municipality, or autonomous region. Some are responsible for transmitting weather information within the province or autonomous district. Posts in coastal provinces, municipalities and autonomous regions also have the duty of preparing forecasts, etc., for the offsea area in their jurisdiction; weather service for the offsea region of Liaoning Province is the responsibility of the Dalian meteorological station.

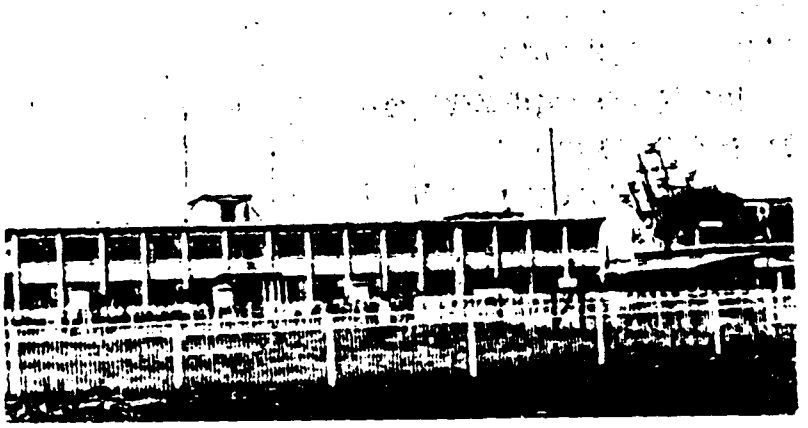


Fig. 5. Beijing meteorological station.

Local-level meteorological stations are set up in the locality (municipality or prefecture) where the party and governmental organization is located, and is responsible for meteorological service within the locality. Meteorological posts located in municipalities including seaports or fishing ports are also responsible for meteorological services and work required by the shipping or fishery departments concerning the port and the sea regions (Fig. 6).

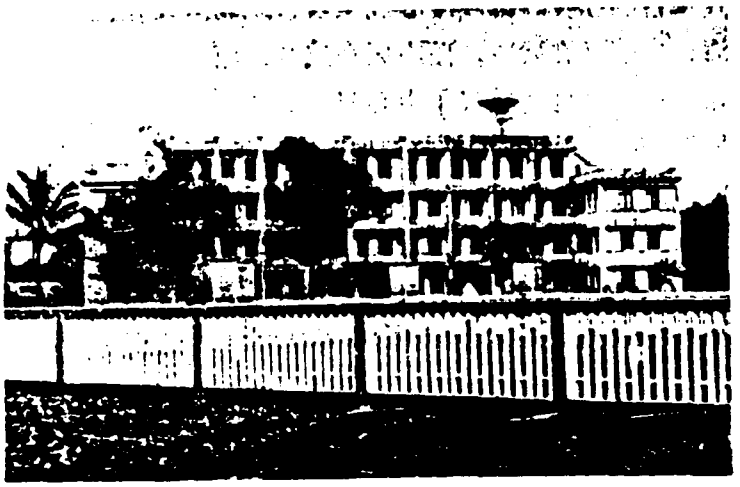


Fig. 6. Guangdong seaport meteorological station.

Weather posts are set up in the city or town where the county government is located, or in some other location in the county. Under ordinary conditions, there is one weather post for each county; but a small number of counties, because their area is relatively large, their is climate complex, or they have special requirements, have two or more weather posts (see Fig. 16-23 [Translator's note: Not included.]) County weather posts, in addition to making atmospheric observations and measurements, also prepare county weather forecasts under the guidance of forecasts on weather formations provided by the higher-level stations, and provide all kinds of meteorological service needed by the local party and government leadership and production departments, in accordance with actual needs.

2.1.2. Characteristics of the Meteorological Network and its Management.

Meteorological stations and posts should be fairly evenly distributed over the entire country at a certain density. Because of China's vast size and topographical complexity, from the shores of the East China Sea to the Tianshan Mountains, from the banks of the Heilong River to the islands of the

South China Sea, from 49 meters below sea level in Xinjiang's Turfan Basin to 4801 m above sea level on Tibet's Anduo, from the vastness of the plateau to the precipitous ridges of the Zongshan Mountains, from bustling cities to isolated border districts, a network of thousands of stations and posts, scattered like stars in the sky, has been established. A reliable foundation has thus been established for collecting information that reflects atmospheric changes, and for expanding and developing the country's meteorological service.

The special points of the work of this network, in summary, are: A high level of local station and post dispersion, speedy centralization of data transmissions, a strict unity in professional techniques, and a broad scope of services in response to different requirements of the various departments. The management of the service has an especially important place in exercising complete control over the functioning of each station and post: It is necessary to establish a management structure appropriate to the special features of the meteorological service's work, and set up a management system and method suitable for carrying out these duties. Only in this way can a high level of functional unity be achieved, and the work proceed systematically and regularly; only in this way can the ultimate goal of improving the quality of meteorological work and contributing to the advance of our social economy be reached.

2.2. The Development of the Meteorological Network

Since the establishment of our People's Republic, because of the urgent need to develop our economy and defense, the network of meteorological stations and posts was rapidly developed with the encouragement and profound concern of the party and the government, and has achieved great success. From the 101 stations and posts (including 29 in the old region of liberation and 72 taken over in the new region of liberation) existing at the time of the foundation of the New China, over the course of 30-odd years, we have come to have, by the end of 1982, 296 stations and 2,352 posts under the National Weather Department--a 26.2-fold increase over the original total. The service is now basically able to meet the requirements of national economic and defense development.

2.2.1. The Great Effort to Construct a Unified Meteorological Network

During the early stages of national reconstruction, because internally the struggle for liberation had not yet been completed and, in 1950, the Korean War against the United States in defense of our country had begun, the most important duties of the meteorological service were in support of the military, especially the air force; at the same time, it was necessary to take the requirements of economic reconstruction into account. In December 1949, after the founding of the Military Committee Weather Bureau, the establishment of meteorological stations and posts necessary for forecasting services was emphasized, on the principle of "construct over a broad area, but concentrate

the leadership." On the one hand, close attention was paid to incorporating existing stations scattered throughout the country and belonging to a variety of departments, and to consolidating and implementing a unified leadership, in order to establish one professional and technical standard; on the other hand, forces were concentrated, for the sake of speed, to train technical meteorological personnel, to replenish the supply of technical instruments, and to establish stations and posts throughout the entire country to meet the needs of development of weather forecasting. At the same time, in order to satisfy the requirements of communications, fishing, agriculture and forestry, water management, and other constructive fields, the emphasis was on the establishments of weather stations in every district and coastal region. By 1952, there were 34 meteorological stations and 283 posts throughout the country for a total of 317 installations.

When China began its first five-year economic reconstruction plan in 1953, control over the weather department was transferred from the military to the civil government. The weather department had the dual responsibility of meteorological service for defense and economic development, and the construction of the network of installations experienced new development. In addition to continuing to build observation posts necessary for weather forecasting, posts for climatic study and collection of climatic data were also constructed. To meet the requirements of the first five-year plan's economic reconstruction, the establishment of stations at the provincial level and key industrial and mining cities and seaports was accelerated. By 1956, the quota for construction of installations prescribed by the five-year plan was exceeded by 26.7% a year in advance; this increased the national total to 99 stations and 1,278 meteorological/climatic posts, for a total of 1,377 installations. At this time the national surface meteorological observation and measurement network had been completed, and the high-altitude sounding network had been highly developed. By 1957, when the first five-year plan came to an end, there were nationally 110 meteorological stations and 1,537 meteorological/climatic posts, for a total of 1,647 installations -- 4.2 times the total at the end of 1952. 73 high-altitude sounding posts and 165 transit wind-measuring posts had been set up, giving our high-altitude sounding network a certain scope. In addition, 27 stations and posts had begun observation and measurement of solar radiation, gathering data for our investigation of the distribution of solar energy and for making use of it. The meteorological network was basically able to fulfill the requirements at the time for the work of forecasting, gathered a large body of data for national use, and provided the necessary meteorological information for aviation.

During this period the goal of meteorological installation construction was clear; it was organized by plan, supervised, and inspected; the work was solid. For these reasons, the speed of construction was rapid. During the process of construction, each level of leadership in the weather department placed great emphasis on the professional and technical training of personnel and on political education. Because the political quality of the personnel was good, there was a strong work ethic and sense of responsibility; no thought was given to personal gain or loss; the spirit of arduous struggle of the People's Liberation Army was carried forward, so the construction of posts, especially in remote, difficult regions, was completed easily; the work

of the new posts developed swiftly, and its professional quality satisfied the prescribed requirements.

2.2.2. Basic Completion of Meteorological Network with stations for Every Special Requirement and Posts for Every County

In 1958, the meteorological service, in order to adapt itself to the needs of serving agriculture, proposed, within the space of three years or less, to complete a meteorological service network for the entire country, including "a station for every special requirement, a post for every county, a small station for every commune, and a group for every team." After this, the disposition and construction of the network began to be implemented according to administrative district divisions. Weather posts, at the same time that they were fulfilling their main task of meteorological observation and measurement, also began to supplement weather forecasts and to perform services for their local area, becoming meteorological advisors for their local party and governmental leaders. Building the meteorological network according to administrative districts had as its purpose adaptation to the needs of leading departments of party and government at every level in the province and county in directing agricultural production and in organizing preventive measures against natural disasters, and promoted improvement of meteorological service on behalf of agricultural production.

In 1958, the construction of meteorological stations, posts, small post and groups underwent broad development. The number of stations and posts alone was increased by 1,108, setting a record for the year in which the most installations were established, with an annual increase rate of 67%. In 1960, the number of installations throughout the country reached a total of 3,240, historically the greatest number. By the end of 1962, after three years of adjustment and consolidation, an actual total of only 2,361 remained. At this time, with the exception of individual autonomous regions, the goal of a station for each special purpose and a post for each county had been basically realized.

Small post are considered a supplement of the national network. These also had been developed in villages to a large extent by 1958; some were located in primary and high schools, some at reservoirs, livestock farms, etc. The village small post were closely connected with the needs of local agriculture; they developed the work of the meteorological service, and had a certain function in disseminating scientific meteorological knowledge.

Nevertheless, because of the erroneous influence of the "leftists," there were many problems during this period concerning the construction of the meteorological network. The most significant was the lack of attention of objective, actual conditions, and the refusal to work according to scientific principles. A large number of installations were built under conditions including insufficient training of personnel, insufficient equipment, and insufficient professional management. The professional work of the newly constructed installations was not only of low quality, but some of them were also chronically unable to function in a normal manner. Because of the

dispersion of technical forces, the professional quality of the original meteorological installations also suffered. As for the construction of installations according to administrative district divisions, it was often the case that, because of changes in district boundaries, installations were frequently constructed, moved and cancelled, with a negative influence on data collection. Redundant installations were not infrequently set up in one place. The establishment of small posts and groups was at times considered a "big deal," and at other times neglected; some occasioned a mass rush into action, and were well known but without substance. Manpower and material were thus squandered.

2.2.3. New Equipment in Meteorological stations and Posts

After three years of adjustment and consolidation, on the foundation of the basically complete national meteorological network, a beginning was made in the study and use of new observation and measuring equipment, increasing the amount of information to accommodate increasing demands in all areas.

Before this time, although the use of optical transits to measure high-altitude winds had been highly developed, it was limited by weather conditions and could not be used to collect high-altitude wind data on overcast or rainy days, thus creating great difficulties for weather analysis, forecasts, and aviation weather services. For this reason, already in 1956, a small number of installations had begun experimental use of radio directional transits. In 1963, a portion of our high-altitude meteorological sounding stations and posts were using the model 701 radar pilot balloon, developed and manufactured in China; this solved the problem of data collection during unfavorable weather conditions. High-altitude radio weather posts began in 1964 to use China's model 59 sounding instrument, which had a favorable effect on the quality of high-altitude sounding.

After 1959, China began to develop its weather radar. In 1966 China's refitted model 843 radar (wave length 10 cm) came into use for monitoring typhoons over wide-spread points. By 1969, from Shanghai in the north to Yongxing Island (Xisha) in the south, in coastal regions that normally are affected by typhoons, an initial typhoon monitoring radar warning line was completed, able to provide useful material for the forecasting of typhoons. In 1971, China's model 711 weather radar (wave length 3 cm) went into formal production, and was installed in succession in meteorological stations in all provinces, municipalities, and autonomous regions. The model 713 (wave length 5 cm), after many years of design, was put into experimental use in 1976 in Guangzhou and Beihai, and was gradually installed in stations in maritime regions and areas subject to heavy rains and storms.

In 1971 satellite cloud map receiver (low portion rate discriminating) was designed and produced in China, and after experimental use went into regular production and distribution. By 1976, meteorological stations in all provinces, municipalities, and autonomous regions were equipped and receiving data from international polar orbit satellites.

Just as our national meteorological network was beginning to be well equipped in all points and to make use of modern technology, the "Great Cultural Revolution" began. It had a serious effect on the use and development of the network's modern technical equipment. Because of the interference and destruction of the counterrevolutionary clique of Lin Biao and Jiang Qing, a confusion arose in people's minds: Technical experts were attacked; some left the country because of persecution, weakening our technological strength. The professional management organization was paralyzed and regulations became lax, bringing a large-scale deterioration in the quality of meteorological work; some stations and posts even stopped work completely. The agricultural meteorological observation work that had been initiated was basically abandoned, and the agricultural portion of meteorological work was severely hampered. Nevertheless, by far the large majority of meteorological personnel withstood these trials and from start to finish remained determinedly at their stations, continuing to make their meteorological observations, measurements and predictions and maintaining the continuity and integrity of meteorological data.

2.2.4. The Advance of the Network Toward the Goal of Modernization

After October 1976, the professional service work of the meteorological installations was reorganized. Systematic regulations were set up and strengthened, and the work began to proceed on the right track. Particularly after the Third Plenary Session of the Party's Eleventh Central Committee, the task of eliminating disorderly and incorrect elements from the guiding thought of the professional service was completed and professional management was strengthened on a firm foundation of accumulated experience. Order in the work of the installations became daily more nearly normal, and the quality of the work improved steadily. In the weather departments throughout the country, a worker's competition developed in the area of continuous error-free measurements and reports. By the end of 1982, several thousand workers throughout the country had realized the goal of "100 shifts without a mistake," and received the praise and commendation of the weather bureau of their province, municipality, or autonomous region. Of these, 256 had worked 250 error-free shifts and were designated as "personnel of the highest excellence in their measurements and reports" with the ratification of the National Weather Bureau and were commended in an official notice.

During this period, the application and promotion of new technical tools developed rapidly. The meteorological network began to make strides toward the goal of scientific and technical modernization. Automatic unmanned weather posts began to be built in 1981. In 1982, China had over 200 weather radar installations (of which 10 had radar with 10 cm wave length and 26 had radar with 5 cm wave length). A radar monitoring network of relatively high density had basically been completed in southeast China, and an experimental radar joint command had been organized with Shanghai, Nanjing, and Hangzhou as its centers. By 1982 over 60 stations over the country had been equipped with different models of receivers for the satellite cloud map, and had developed from a low to a high portion rate discrimination; and, from being able to receive polar-orbit weather satellite data, had developed to receiving earth-

static satellite weather data. Over 1000 installations were equipped to receive weather map transmissions directly. The Beijing Weather Center had set up an electronic, computerized weather communications hub, and numerical weather forecasts were also placed into service.

In the past thirty-odd years, the achievements in constructing the meteorological network have been enormous. China has built up an elementary network of modern stations and posts. In density, these installations have reached and, in certain regions, exceeded the world-wide meteorological standards. In quality and timeliness of meteorological observations, China is one of the best countries in the world. As the network was constructed and developed, a corresponding complete system of professional management was organized. In the past few years, in the work of reforming meteorological electronic codes and other world-wide professional changes and experiments, China was able to perform its duties in a wholly satisfactory manner, and won the praise of the international meteorological organization and other countries, winning glory for our nation.

2.3. Classification and Duties of China's Meteorological Networks

2.3.1. The Atmospheric Observation and Measurement System

The atmospheric observation and measurement operations of meteorological stations and posts includes eight different specialized measuring and observation networks: The climate, weather, high-altitude weather, aviation weather, agricultural weather, solar radiation, weather radar, and satellite weather networks (see Fig. 13 [Translator's note: Not included]). Each station and post has the responsibility for one or more item, according to the prescriptions of the National Weather Bureau. Their ranks and missions are determined on the basis of professional and scientific requirements, as well as geographical and environmental conditions (Fig. 7-12).

2.3.1.1. Climate Network

Climate posts are established to observe and measure atmospheric changes continuously at specified times, to record and accumulate climatic data to contribute to the understanding of climatic conditions, and to study and develop climatic resources. The distance between climate posts is about 50 km. Climate observation is the basic type of observation performed by climate installations, and are ordinarily carried out three or four times a day. There are four levels of climate posts: The first level is the standard climate post, which undertakes 24 observations a day. The second level is the basic climate posts, and, with the first level, constitutes the national climate network. The third level is the ordinary climate post, and the fourth level is the auxiliary climate post; these latter two supplement the national network. All four levels of climate installations in a given province,

municipality, or autonomous region form the climate network for that province, municipality, or autonomous region.

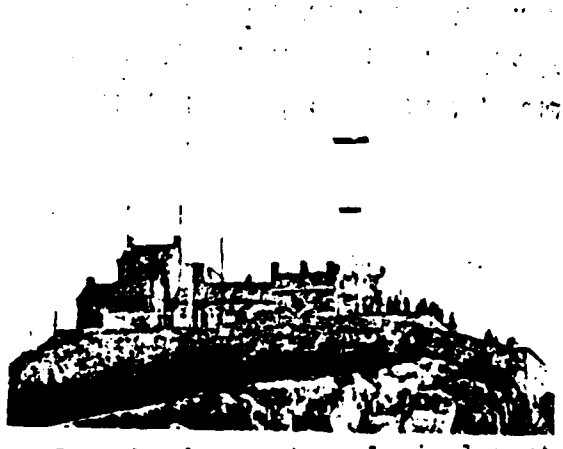


Fig. 7. Shandong meteorological post.

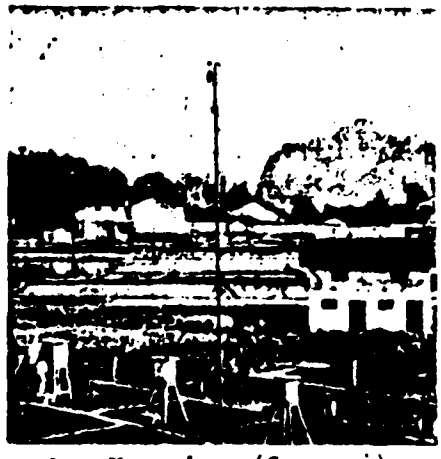


Fig. 8. Yangshou (Guangxi) meteorological post.

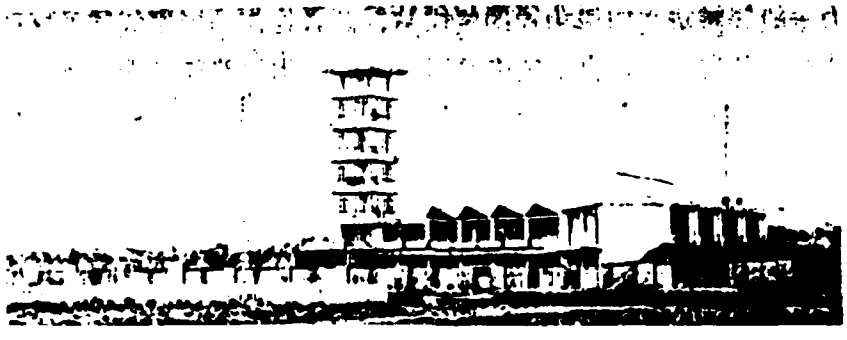


Fig. 9. Shanghai Yushan meteorological post.

2.3.1.2. Surface Weather Network

The surface weather posts are responsible for surface weather observations and measurements at specific times according to regulations, and for timely reporting for the use of weather analysis and forecast. To satisfy the requirements of weather scale analysis, the distance between these posts is normally no larger than 150 km. The current state in China is that in the eastern districts the distance is less than 150 km, while in some areas of Xinjiang, Tibet, Qinghai, and Inner Mongolia provinces and autonomous regions, the distance is greater than 150 km. Except for the supplementary construction still required in the western districts, the network is able to satisfy the requirements for weather scale analysis. 636 installations from the entire national network were selected for organization into the surface weather network.

The surface weather posts are classed into three levels, depending on the frequency of their daily weather dispatches. There are 444 first level basic surface weather posts, which make 6-8 daily surface weather observations and reports; there are 192 second level basic surface weather posts, which make 4 daily weather observations

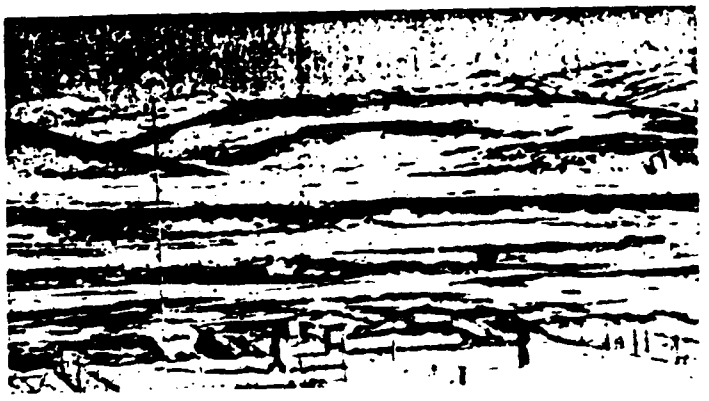


Fig. 10. Wuqia/Turergete (Xinjiang) meteorological post.

Fig. 11. Bange (Tibet) meteorological post.

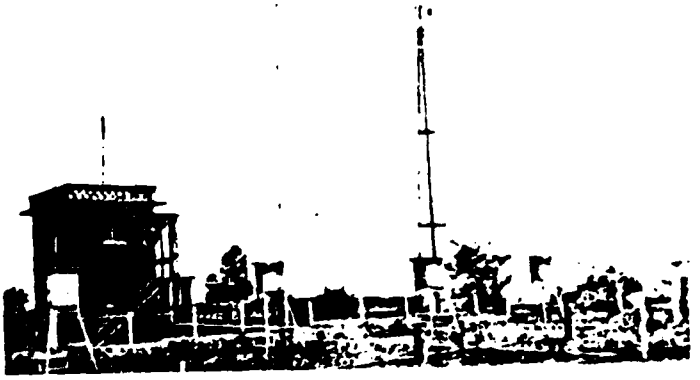


Fig. 12. Shapingba (Chongqing) meteorological post.

and reports; the third level ordinary surface weather posts issue 1-2 small-map weather reports daily, according to the forecasting requirements of the station in their province, municipality, or autonomous region. The first and second level basic surface weather posts are ordinarily stations and posts within the national climate network.

2.3.1.3. High-altitude Weather Network

The high-altitude phenomena network was organized from posts using radio and radar to observe and measure the vertical structure of high-altitude pressure, temperature, wind direction and speed and other key meteorological factors, and putting out timely high-altitude weather transmissions. The posts ordinarily are spaced at a distance of 300 km.

China has two levels of high-altitude posts. The first level (also called radio sounding posts) uses radar and radio instruments to undertake a composite observation of key elements in high-altitude weather; they are the heart of the high-altitude network, and make observations and issue reports at set times twice daily. Of these, 63 also undertake radar wind measurements every two hours for the use of civil and military aviation. The second level high-altitude posts (also called wind measuring posts) only undertake high-altitude wind measurements. They undertake wind measurements with optical transits twice a day and report their results.

Not only have China's high-altitude posts developed quickly, but they have also used new technologies in the course of construction and raised the level of observation quality; they have well fulfilled the nation's needs, and in world-wide and regional exchanges of meteorological information have done a great amount of work, winning favorable comments internationally.

2.3.1.4. Aviation Weather Network

The aviation weather report posts most importantly provide reports needed for the security of military and civil flights, as well as communications on dangerous flying conditions. The posts are divided into permanent and occasional aviation warning posts, according to need.

The permanent aviation warning posts issue hourly (or half-hourly) aviation reports for a predetermined period of the day (some for 24 hours, others from 3 a.m. to 8 p.m.) When it is found that there are weather conditions that pose a severe threat to air navigation, a weather warning is issued immediately. Occasional aviation warning posts are telegraphically assigned as required by the department that is making use of them; on the basis of the assignment they issue aviation weather reports and warnings over the prescribed period.

The large majority of surface weather posts in China and a portion of the climate posts have this responsibility. The location and number of the aviation warnings vary from year to year with the circumstances.

2.3.1.5. Agricultural Weather Network

This is a network of posts which has developed a variety of special observations and measurements to serve the needs of agriculture. They have been set up based on topography, climate, the nature of the soil, agriculture, forestry, grazing, economic crops, patterns of planting, important areas of development, and the production bases of marketable grain. They are divided into three levels according to the number of professional duties they perform and the scope of their service. The first level is experimental agricultural weather posts, which are bases for agricultural investigations as well as the heart of the national agricultural weather network. According to the second-level division of the entire country into agricultural climatic regions, they are established in every major agricultural, forestry, grazing, and economic crop region; they undertake agricultural meteorological experimentation and investigation, and systematic observations and measurements, recording and accumulating detailed parallel data on the relationship between weather and crops, and publishing agricultural meteorological information. The second level of posts is the basic agricultural weather posts, the principal part of the national agricultural weather network. They are set up on the basis of the requirements of the national and provincial agricultural climate divisions. The main distinction between these two levels of posts is that the second level does not have formal, definite duties in the area of experimental agricultural meteorology. The third level is the ordinary agricultural weather post, established on the basis of their locality's needs.

2.3.1.6. Solar Radiation Network

The solar radiation observation posts are intended to gather data for the investigation of solar radiation and the development of means of tapping the sun's energy. China's solar radiation posts are divided into two levels on the basis of their duties. The first level of solar radiation posts undertake basic observation on general solar radiation and radiation equilibrium measurements; a small number of these posts also performs thermal equilibrium measurements. The second level only undertakes basic observations on general solar radiation.

2.3.1.7. Weather Radar Network

The main mission of weather radar observation posts is to monitor typhoons, heavy precipitation, and similar weather systems. The Chinese weather radar network, relying chiefly on 5-cm wave-length radar and secondarily on 10-cm and 3-cm wave-length radar, is mainly distributed over

the east and south regions, which are subject to overcast conditions, storms, frequent typhoons and strong convection conditions. Locations are chosen that are appropriate to the needs of aviation, flood control and the construction of reservoirs.

Weather radar posts are divided into two levels. The first level is the basic weather radar post, the joint-command radar monitoring network, consisting of 5-cm and 10-cm wave-length radar. The second level is the ordinary weather radar posts, using 3-cm wave-length radar; they chiefly serve local needs, though some are integrated into the joint-command network.

2.3.1.8. Satellite Cloud Map Receiving Network.

The duty of the satellite cloud map receiving posts is to receive data provided by foreign weather satellites, and from a macroscopic point of view to understand thoroughly the changes in the atmosphere and in cloud masses. This activity is of obvious use in monitoring typhoons at sea, large storms, and other potentially calamitous weather situations. Beginning in 1971, receiving equipment (low portion rate discriminating), designed and manufactured in China, was placed in service; this equipment received data transmitted from the American polar-orbit weather satellite, and distributed the information progressively to weather stations in the provinces, municipalities, and autonomous regions. Later, improved equipment (high portion rate discriminating) was provided; while receiving data from American weather satellites, it is also able to receive data from Japan's earth-static weather satellite.

In addition to the above eight varieties of special weather networks (see Fig. 13 [Translator's note: Not included]), there is currently active construction of atmospheric background and pollution monitoring posts required by meteorological science and collection points for analysis of the acidity of rain.

CHAPTER 8

METEOROLOGICAL SERVICE

8.1 General Introduction

Protection of the people and service for the building of socialism are the sole aim of China's meteorological work. Meteorological science is indeed not able directly to establish socialist prosperity, but by serving the building of the people's economic production meteorological technology can be transformed into productivity and can encourage the development of production, safeguard the lives of the people and ensure the security of national wealth, thus providing advantages for the economy and society.

The atmosphere is in unceasing motion, which results in a constant change in meteorological conditions. At times the sky is clear and the air crisp, the breezes pleasant and the sun delightful, and for the four seasons of an entire year weather conditions are favorable, completely advantageous for human productivity and life. At times, however, the wind and rain are tempestuous, there is thunder and lightning, and the climate is abnormal, creating difficulties both for productivity and living; at times there are even meteorological disasters, leading to serious losses of life and property. The climate of our country is complex; every year there are droughts, floods, windstorms, frost damage, and other natural disasters. The only variable is the frequency of disasters, the scope of their influence, the severity of the damages, and the duration. For this reason, every level of Party and governmental leadership, the production departments in every locality, and the broad masses of the people are all highly concerned about weather, and require that the Weather Department provide meteorological service so that they can make use of advantageous conditions in arranging their productive activities, seize the initiative in a timely manner in preventing and combatting disasters, protect human life to the greatest extent, and reduce or avoid losses caused by disasters.

Meteorological work in our country, from the time it was initiated, has reflected the goal of the people's meteorology for the people. In its early period, the Weather Department affirmed the policy of "build, unify, serve," manifestly indicating that the goal of meteorological work consists of service, and that its main mission is service. After 1958, it was further emphasized that service is the guiding principle of meteorological work, and meteorological work, if it neglects the idea of service, loses its value and reason for existence. In 1978, after the Third Plenary Session of the Eleventh Central Committee of the Party, the Weather Bureau instructed the entire personnel of the meteorological service to continue their industrious activity, taking service as the beginning and end of meteorological work, and to perform every item of their work well on behalf of promoting vigorously the "four modernizations." Even though the wording of each period varies, nevertheless at all periods it is very clear that meteorological service is the sole aim of meteorological work. The Weather Bureau observes this goal

and centers its activities around the country's construction priorities at any given time period, diligently performing its meteorological service, unceasingly expanding the range of service, improving the quality of the service. For these reasons it has received the respect and support of the Party, the government, and production departments, thus enabling the meteorological enterprise quickly to develop and flourish.

8.1.1. Main Emphasis on Building National Defense and Military Service

At the end of 1949, before the struggle for national liberation had been completed, meteorological work principally adapted itself to service for the war of liberation. In June 1950, when American imperialism had launched its war of invasion against Korea, and the fires of war extended to the banks of the Yalu River, and the whole nation began the struggle to oppose America and aid Korea, the weather service was under the direct leadership of the People's Revolutionary Military Committee, and its activities revolved around the war effort, especially respecting the need of building the People's Air Force. Based on a very weak foundation, on the one hand it made great efforts to set up a meteorological network of stations and posts to provide a system of meteorological support for the Air Force; on the other hand it strengthened its weather forecast, warning, and data service. From 1950 to 1952, the economy of the Chinese people enjoyed a three-year recovery period and the Weather Department began, at the same time as it was performing its military weather service, to make all possible efforts to expand its service to adapt itself to the needs of communications, fishing, agriculture, forestry, water projects and other construction. The meteorological stations in every location also gradually developed their weather service for economic construction and disaster prevention and control, as well as expanding the scope of their service, performing vigorously on behalf of economic construction.

8.2. Service Both for National Defense and Economic Construction

In June 1954, the National Meteorological Committee resolved "on behalf of the modernization of national defense, the industrialization of the country, communications and transportation, agricultural production, fishery production, and other services, to prevent or reduce the loss of human life and property and the resources of the country; and to aid and support vigorously national reconstruction in all its aspects," making this resolution the five-year policy of meteorological work. Hereafter, a weather warning network of national scope was organized, as well as a broadcast system for aviation weather reports, to guarantee the security of military and civil air flights and airport installations. In order to adapt to the needs of fishing, the salt industry, manufacturing, inland river transportation, livestock raising and other services, a group of meteorological stations and posts was constructed at the same time, and in 1956 the specialized meteorological stations (posts, groups) of civil aviation, the aircraft industry, agriculture and forestry, and other departments were successively

brought under control of the weather service. The ability was developed to supply the meteorological data and forecasting services required by the country and critical engineering projects in making their plans. At the beginning of 1954, on the basis of the spirit of the "Target for the Improvement of Violent Weather Forecasts, Warnings, and Preventive Measures" issued by Premier Zhou Enlai, the Weather Department, together with the Communications, Agricultural, and Fishery Departments, ratified the weather service contract, and cooperatively issued announcements on improving typhoon defense work. In the same year, the Weather Bureau assigned all meteorological stations to improve their frost/freezing conditions forecasts in all regions, and all posts to develop an individual frost/freezing forecast supplement, to serve the local agricultural interests. In 1955, as the movement for the cooperative transformation of agriculture developed, the Weather Bureau proposed the idea of "the forecast goes to the country," and began preparations for implementing agricultural meteorological work. In 1957, to accommodate the northeast region's mission of aerial forest protection, mobile forest-protection weather stations were established, and forecasts on forest fire danger began to be issued for the provinces of Hielongjiang, Jilin, and Inner Mongolia. In addition, stations in all districts energetically developed their meteorological flood prevention work. In 1954, when the Yangtze River meteorological flood prevention service had obvious successes, the central weather station and the Shanghai and Wuhan weather stations received a message of congratulations. In 1955, the Weather Bureau began to have responsibility for the service weather data preparation and climate analysis for the Yangtze, Yellow, Huai, Hai, Songhua, Xin'an, and other important river regions. On 1 June 1956, when the weather forecast was publicly broadcast, meteorological work achieved new breadth in its service for the masses and for production. [Translator's note: Section 8.3 is not included.]

8.4. Military Meteorological Service

"Favorable weather, geography, and populace" are three factors that determine military success. Of these, "favorable weather" means meteorological conditions. Now as in antiquity, in China as elsewhere, there are many examples of success of failure depending on the weather. In the Eastern Han dynasty, 208 A.D., the famous Battle of the Red Cliffs offers a vivid example of the contribution of weather to military success; in modern warfare, there is likewise no lack of examples. The same meteorological conditions may at times assist the defending side in opposing the enemy's attack, and also aid the attackers in covering their assault and winning a surprise victory.

Modern military operations frequently are a cooperative effort involving army, navy and air force. This adds to the complexity and difficulty of military meteorological support. Because the activities army, navy, air force, and other branches of the military each have their own special characteristics, the meteorological support requirements are not completely similar, and at times are quite different. For example, the meteorological support the air force requires for takeoffs and landings, providing cover for

surface fighting, and target bombings consists mainly of information and forecasts on conditions such as visibility, cloud cover, and wind. The support the navy requires for setting sail, providing cover for amphibious operations, and launching assaults is chiefly information and forecasts on conditions such as wind, waves, and sea fog. The army, for offensive and defensive actions, needs to understand a variety of weather conditions: The artillery is concerned with wind conditions, armored troops with the freezing and thawing conditions of the ground, and so on. Concerning logistics and supplies for modern warfare, different equipment and installations must be provided under various weather conditions. It may be said that all branches of the military, equipped with modern technical weapons, in their training, fighting, and logistical activities, are unable to do without military meteorological service. And military meteorological service requires a weather forecast service, as well as services for meteorological reports, climate analysis, meteorological data, and the like.

The foundation of meteorological work in the new China is closely linked with the requirements of the military. It may be said that meteorological work matured under the tutelage of the Chinese People's Liberation Army. After the founding of the new China, before most undertakings had begun to flourish and the national economy was in tight straits, the fact that the meteorological enterprise was able to be placed on the agenda for national construction and develop with satisfactory speed was principally because of the urgent need for meteorological support for the building of a national defense and for the mission of the military.

The Military Committee Weather Bureau, during the more than three years since its founding at the end of 1949 until it was transformed in August 1953 into the governmental system, established an initial internal meteorological support system for the People's Air Force; according to the principle of "serve while setting up," many technical meteorological personnel were trained under extremely difficult conditions. At the same time as a meteorological support system was being established for the Air Force, weather posts were being set up to develop forecasting and provide weather information, and to gather and order weather data for all varieties of military tasks. During this time, meteorological service was triumphantly carried out for the missions of liberating Hainan Island and the Zhoushan Islands, and of supporting the Koreans against the United States.

When the meteorological department was incorporated into the governmental system, the Military Department had already begun to set up gradually a relatively complete meteorological support system for the internal needs of the military, including the air force, navy and other branches. This system was responsible for meteorological support tasks for training, patrolling and warfare. In January 1955, in the cooperative operation to liberate Yijiangshan Island off the Zhejiang coast, the military meteorological department, with the valuable assistance of the local Weather Department, made very accurate weather predictions, providing a basis for the commanding officer to choose precisely the time to launch operations. The amphibious troops set out while the wind force at sea was still relatively great, but just as they approached Yijiangshan Island the wind died down, and they were

easily able to carry out their task of making a landing and giving battle under air force cover.

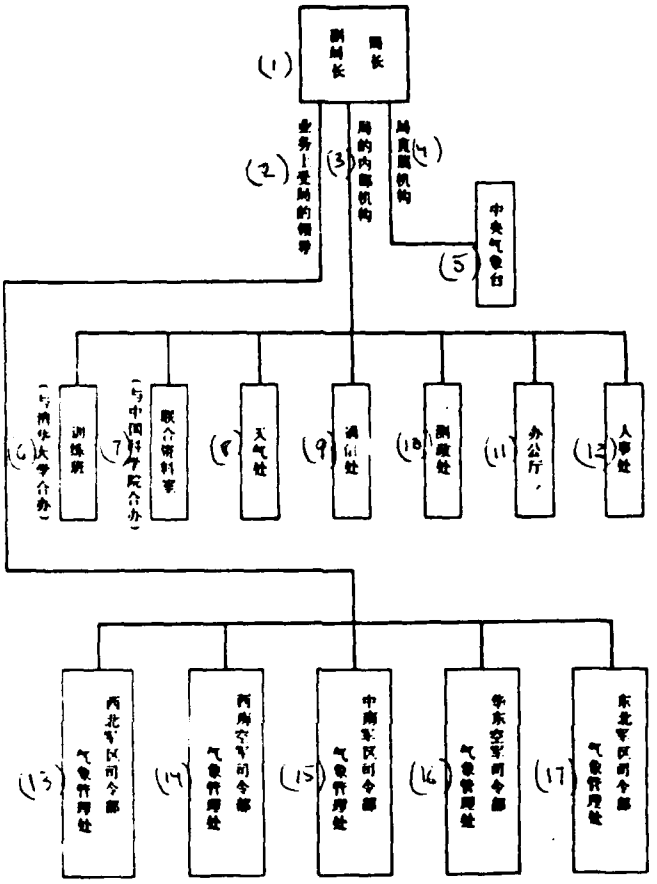
For many years, local Weather Departments and military Weather Departments have uniformly cooperated very well in their meteorological work. The military department, except when undertaking special observations that they themselves require, chiefly use the basic meteorological information and data provided by the local weather stations and posts. Early in the period of national construction, although the number of meteorological stations and posts was very small, nevertheless they took on the responsibility of providing a great quantity of aviation weather reports to the military departments. From 1954 to 1960, the "Provisional Aviation Weather Observation Procedures," the "Provisional Severe Weather Announcement Regulations," and other regulations were established in succession, strengthening the organization and management of the aviation weather information work, and putting the military weather information service gradually on the right track. In 1960, the "Aviation Weather Report and Aviation Sever Weather Warning Report Procedures" were set up; these covered the organization and scope of aviation weather information, the frequency of special plane flights and special services guaranteeing the supply of information, and the organization and reporting requirements, causing the aviation meteorological service to undergo daily improvement. By the end of 1982, following the requirements of the above-listed regulations, there were in the entire country 1,189 weather stations and posts that were responsible for supplying aviation meteorological information, representing 44.9% of the total number of stations and posts in the country. Some of these are in operation throughout the year, and night and day, without stopping, supply aviation meteorological information once every hour; others are assigned provisionally according to the requirements of the unit using them, and provide during the entire day, or from before dawn until night, aviation reports on the schedule of once every hour. In addition, meteorological observation personnel are also required to monitor changes in the weather constantly, and when dangerous weather phenomena that threaten the security of aviation appear or disappear, they must within five minutes issue or cancel a severe weather report, bringing it to the attention of air control and dispatching departments.

In order to accommodate the modernization of national defense, the local Weather Departments are also responsible for providing climate analysis to the military department. In the 1970's, the Weather Departments expended great effort to collect and put in order data from the Pacific, Atlantic, and Indian Oceans and the adjacent land areas; at the same time they also organized the forces of the entire country to undertake military climate surveys and compiled reference works on the subject for regions as well as provinces, municipalities, and autonomous regions, including indications of strategic military points.

In addition, all levels of weather stations and posts, cooperating with nuclear experiments, guided missile and satellite launchings, and other scientific technical experiments in the interest of national defense, provided excellent meteorological service (see Fig. 69 [Translator's note: Not included.])

In successive important military operations, like the quelling the rebellion of the reactionary Tibetan upper strata in 1959 and the defensive Sino-Indian border war in 1962, the local Weather Departments cooperated vigorously and on their own initiative provided meteorological service to the military departments. In 1979, during the defensive war against Vietnam, the Weather Bureau of the Zhuang Autonomous Region (Guangxi) organized a force on behalf of the air force attack to compile statistical data and undertake analysis. The weather posts along the line of the border persevered at their stations and supplied great amounts of meteorological information in a timely manner. In autumn of 1981, our first maximum scale military exercise was undertaken in northern China. The affected meteorological stations and posts coped with very great difficulties during this exercise, and were responsible for over two months for supplying meteorological support, including supplying all kinds of normal and extraordinary weather information in a timely manner for the units, explaining many times to the unit commanding officers and military weather departments the influence of the local region's meteorological peculiarities and topography on the weather and sharing their methods and practical experience in forecasting high winds, precipitation, and hail. Before the exercise, for the training of all branches, they provided a great number of weather forecasts, and, eight days in advance, with relatively great accuracy, predicted the weather on the day of the exercise. In general, they performed their weather support mission for this military training exercise in a satisfactory manner.

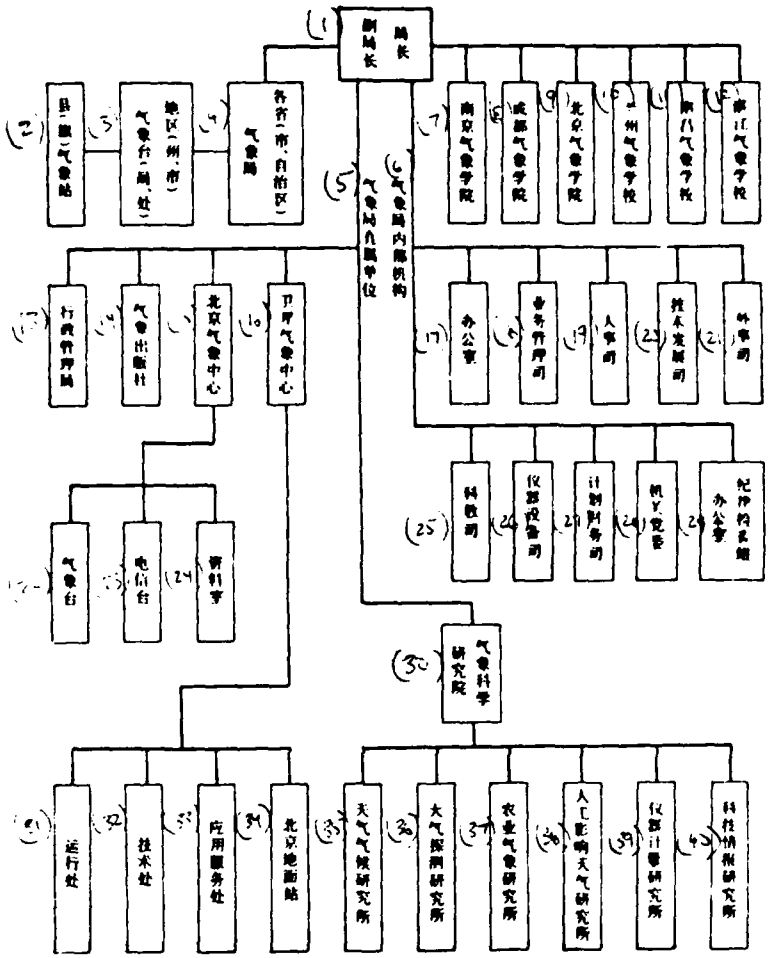
Supplement 2. Organization of the Military Committee Weather Bureau, 1950.



Key:

1. Bureau chief, assistant bureau chief.
2. Under the bureau's professional leadership.
3. Internal bureau structure.
4. Organization directly subordinate to the bureau.
5. Central Weather Station.
6. Training (in cooperation with Qinghai University.)
7. Joint data office (in cooperation with the Chinese Academy of Science.)
8. Weather office.
9. Communications office.
10. Policy office.
11. Business office.
12. Personnel
13. Northwest military district HQ weather administration office.
14. Southwest Air Force HQ weather administration office.
15. South central military district HQ weather administration office.
16. East China Air Force HQ weather administration office.
17. Northeast military district HQ weather administration office.

Supplement 3. Organization of the National Weather Bureau, 1984.



Key:

1. Bureau chief, assistant bureau chief.
2. County weather posts.
3. Region (prefecture, municipality) weather station (bureau, office).
4. Provincial (municipal, autonomous region) weather bureau.
5. Units directly subordinate to Weather Bureau.
6. Internal bureau structure.
7. Nanjing Meteorological Academy.
8. Chengdu Meteorological Academy.
9. Beijing Meteorological Academy.
10. Lanzhou Meteorological Academy.
11. Nanchang Meteorological Academy.
12. Qijiang Meteorological Academy.
13. Administration.
14. Meteorological Publishing House.
15. Beijing Weather Center.
16. Satellite Weather Center.
17. Business office.
18. Professional management department.
19. Personnel department.
20. Technical development department.
21. International department.
22. Meteorological stations.
23. Telegraphic stations.
24. Data office.
25. Scientific training department.

26. Instruments and equipment department.
27. Budget department.
28. Organic Party committee.
29. Records/survey department.
30. Meteorological Academy.
31. Transportation department.
32. Technical department.
33. Applications service department.
34. Beijing surface station.
35. Weather and climate department.
36. Atmospheric sounding department.
37. Agricultural meteorological department.
38. Human environmental influence department.
39. Instruments and calculations department.
40. Scientific/technical information department.

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